

## RECENT EARTHQUAKES.

IN connection with the announcement made in our notes columns (p. 349) of a remarkable disturbance in the Pacific on January 13 and of an earthquake in Jamaica on February 5, the following abstract of recent earthquakes recorded at Shide, Isle of Wight, which Prof. Milne has made at our request, is of interest:—

The most remarkable disturbance recorded at the Isle of Wight station during the month of January was one which commenced at 1h. 59m. a.m. on January 14. Maxima occurred at 2h. 36m. and 2h. 39m. At 3h. 34m. these are apparently repeated, indicating an origin  $137^{\circ}$  distant, and therefore possibly to the east of Tahiti—the scene of the recent disasters occasioned by hurricanes and sea-waves. Similar records were obtained at Kew, Bidston, Edinburgh, and probably at all stations furnished with instruments capable of recording the unfelt movements of large earthquakes.

Since the commencement of February, the earthquakes noted at Shide in the Isle of Wight have been as follows:—

Date.	Commencement.	Maximum.	Duration.	Amplitude.
	h. m.	h. m.	h. m.	mm.
Feb. 1	10 1'6	10 18'9	1 5	6
„ 4	6 51'8	6 54'9	— 10	0'75
„ 5	19 4'5	19 46'2	2 30	2 to 0'75
„ 6	8 5'5	8 14'7	— 30	1'0

The first is a large disturbance which had its origin at some place about 4500 kms. distant, possibly in Turkestan. The third disturbance—which as recorded at Shide is small—may refer to the West Indies.

J. MILNE.

## JAMES GLAISHER, F.R.S.

WE regret to see the announcement that Mr. James Glaisher died on Saturday last, February 7. Born April 7, 1809, he had nearly attained the great age of ninety-four years, the major portion of which was devoted to unceasing work of a varied nature, mainly, however, directed to practical meteorology.

At the age of twenty he was appointed as assistant on the principal triangulation of the Ordnance Survey of Ireland, and from 1833-1836 was an assistant at Cambridge University, whence he proceeded in the latter year to the Royal Observatory, Greenwich, and having been, in 1840, promoted to the position of superintendent of the magnetical and meteorological department, he remained there until his retirement from official life in 1874.

His contributions on subjects bearing on meteorology and astronomy were too numerous to allow of our giving more than a passing notice. His hygro-metrical tables, published in 1847, which have reached their eighth edition, are still the standard work on the subject for the British Islands, and "Travels in the Air" (1871 and 1880), "Diurnal Range Tables" (1867), "Mean Temperature of Every Day for Greenwich, 1814-1873," "Report on the Meteorology of India" and "Meteorology of Palestine" are among his chief writings.

From 1862-1866 he made twenty-nine balloon ascents in the interests of meteorological science, and the results were given in reports to the British Association at their annual meetings of those years. The ascent on September 5, 1862, is particularly memorable from the fact that he and the late Mr. Coxwell attained the highest distance from the earth

(37,000 feet) ever reached, and formed the subject of a most thrilling experience, which nearly had a tragic termination for both of the intrepid aerial explorers.

As the pioneer of systematic organisation of meteorological observations, the results of his endeavours may be seen in his weekly, quarterly and annual reports on the "Meteorology of England," contained in the periodical returns of the Registrar-General of Births, Deaths and Marriages for England and Wales during the long period of sixty-one years (1841-1902). He was a juror in the class of scientific and philosophical instruments at the exhibitions of 1851 and 1862, and, apart from his scientific work, was actively engaged in other useful spheres of labour.

He was a fellow of several of the learned societies. For upwards of half a century he was on the roll of membership of the Royal Society, to which he was elected on June 7, 1849, and from time to time he contributed papers to the *Philosophical Transactions*. In 1850 he was one of the founders of the British Meteorological Society—now the Royal Meteorological Society—and for many years took a leading part in the conduct of its affairs, being its original secretary, "who nursed it through its infancy and youth, and left it to other hands only when it was old enough and strong enough to walk alone" (president's address in the jubilee year). He was also a past-president of the Royal Meteorological Society, the Royal Microscopical Society, the Royal Photographic Society and the Aeronautical Society of Great Britain, a fellow of the Royal Astronomical Society, and for many years was on the executive committee of the Palestine Exploration Fund, of which he was for twelve years the chairman. He had also been honoured with the honorary fellowship of several foreign scientific bodies.

## NOTES.

We are fortunate in being able to publish the appreciative notice of the late Sir George Stokes's scientific work, contributed by Lord Kelvin to another part of the present issue. So long ago as 1875 (vol. xii.) Sir George Stokes was one of our Science Worthies, and the account of his career then given is now supplemented by the record of his life's work and estimate of its influence on scientific progress, which Lord Kelvin has sent us. The funeral at Cambridge on Thursday last was a striking ceremony, in which men of distinguished eminence in many branches of knowledge took part, as will be seen from the list given on pp. 345, 346, of some of the people present. It is but rarely that such an assembly is drawn together, and the presence of so many men of light and leading showed the high regard in which Stokes was held, and testified to a widespread desire to do honour to his memory. It is inexplicable that no attempt was made to find a place for the body in Westminster Abbey. Great by his works and personality, Stokes was a man whose memory the nation should delight to cherish, and if such men as he are not buried at Westminster, it is difficult to understand who should find a place there.

THE gold medal of the Royal Astronomical Society has this year been awarded to Prof. Hermann Struve, of Königsberg, for his work on the satellites of Saturn. The medal will be presented at the annual general meeting to be held to-morrow, February 13. The Councillor of the German Legation will attend the meeting and receive the medal for Prof. Struve, who is unable to be present.

A CENTRAL NEWS message from New York reports that earthquake shocks were felt on Sunday evening in Indiana, Illinois, Kentucky and Missouri.

A DESPATCH from Kingston, through Reuter's Agency, states that an earthquake with loud subterranean rumblings occurred in Western Jamaica during the evening of February 5.

ACCORDING to news from San Francisco, a hurricane and great wave struck the Society or Tahitian Islands and the Tuamotu Archipelago, 500 miles further east, on January 13. The hurricane lasted for several days, but it was most severe between January 14 and 16. Eighty islands are said to have been overwhelmed and 1000 natives killed. Native refugees at Tahiti state that the sky began to assume a peculiar aspect on January 11, and that the inhabitants were all greatly alarmed. The air was very oppressive, and the wind began blowing fiercely from the south-east. Hour by hour it increased in violence, and every wave was higher than its predecessor. The natives on several of the adjacent islands succeeded in making their way to Hikuera, which has the greatest elevation of all the islands in the group. A wall of water, said to have been at least forty feet in height, rose and rushed hundreds of miles wide through the islands. For ten hours this state of affairs prevailed. The storm extended to Raiatea in the Leeward Isles, where much damage was done, but no fatalities occurred. In connection with this disturbance, the earthquake records described by Prof. Milne on p. 348 are of interest.

THE *Daily Mail* announces that excellent telephonic communication was established on February 3 between the central State office in Copenhagen and Frankfort and Mayence in Germany, a distance of about four hundred miles. The Dutch Vice-Consul at Kallundborg, North-West Seeland, also spoke to Frankfort, every word being distinctly audible.

DR. A. S. GRÜNBAUM has accepted the post of director of cancer research at the invitation of the committee appointed to administer the fund initiated for that purpose by a gift of 10,000*l.* from Mr. Sutton Timmis, of Liverpool. The work will be carried on at the University College, Liverpool, and the Royal Infirmary.

WE learn from the *Athenaeum* that the King of Sweden and Norway has instituted a gold medal in honour of the centenary, last autumn, of the famous mathematician Niels Abel. The medal, which will be given by the Academy of Science in Christiania every fifth year, will be awarded for eminent work in pure mathematics, without regard to nationality.

MR. H. BALFOUR, the curator of the Pitt-Rivers Museum at Oxford, has been elected president of the Anthropological Institute for the year 1903. The council has selected for election as honorary fellows of the Institute, Mr. A. W. Howitt, of Melbourne, for distinguished services to the ethnology of Australia; Dr. F. von Luschan, for numerous contributions to ethnology; and Dr. Salomon Reinach, for his researches into the early history of civilisation in the Mediterranean and western Europe.

REMARKABLE results in the way of swift locomotion are said by the *Westminster Gazette* to have been obtained with the new Midland Railway compound engines, which for a distance of fifteen miles between Leeds and Carlisle attained a speed of more than eighty-two miles an hour, with a load of about 350 tons. The total weight of engine and tender is eighty-five tons, but the weight in working order is 112 tons. These engines are working express passenger trains between Leeds and Carlisle.

To encourage investigations into the increase of fertility in soils by the action of bacteria and other micro-organisms, under the influence of mineral manures, with special reference to manuring with basic slag, the Berlin Association of Thomas's Phosphate Works has instituted a competition, with prizes amounting to a total of 1950*l.* Scientific essays and experiments conducted by practical farmers will be admissible in the competition. The competition is to be open to all, without regard to nationality. Competitors are requested to send in their essays, written in German, to the address of the association, Berlin, S.W., Hafenplatz 4, not later than February 1, 1906.

THE Berlin correspondent of the *Times* states that Dr. Sven Hedin delivered a lecture on February 7 to the Geographical Society of Berlin upon his recent journeys in Central Asia and Tibet. The Imperial Chancellor, Count von Bülow, who had intended to be present, was at the last moment prevented from attending. The Imperial Secretary of State for Foreign Affairs, Baron von Richthofen, appeared on behalf of the German Foreign Office. At the conclusion of the lecture, Prof. Hillman announced that the German Emperor had conferred on Dr. Hedin the second class with the star of the Prussian Order of the Crown. Dr. Sven Hedin was elected an honorary member of the Berlin Geographical Society, and was presented with the golden "Nachtigal" medal, which was founded in memory of a well-known Central African explorer.

THE United States Commercial Agent at Vladivostock states in a recent report that a German engineer has found new naphtha ground on the eastern part of Sakhalin Island, and also a large lake filled with dry naphtha. This, he says, would be excellent material for preparing asphalt. This engineer thinks the prospects for naphtha promise to be richer than those of Baku.

THE *Scientific American* gives an account of some experiments in wireless telegraphy which were recently carried out with a moving train, and proved very successful. Several difficulties peculiar to the case presented themselves; a vertical collecting wire could not be used, and horizontal wires inside the cars had to be substituted. It was also found that the receiving relay could not be used at its maximum sensitiveness on account of the vibration of the train. In spite of these and other minor drawbacks, it was found possible to keep the train in touch with the station for from eight to ten miles. The experiments were carried out by Dr. E. Rutherford and Dr. H. T. Barnes, of McGill University, Montreal.

DR. R. T. GLAZEBROOK, writing to the *Electrician*, states that the arrangements for carrying out photometric work at the National Physical Laboratory are now nearly completed. The photometric laboratory has been largely equipped by the generosity of Messrs. Crompton, who have presented a potentiometer outfit, the Electrical Power Storage Co., which is giving a battery of 150 cells, and Mr. Trotter and Sir Wm. Preece, who have presented other apparatus. A 10 c.p. pentane standard is being compared with that of the gas referees by Mr. Vernon Harcourt, and Mr. Glazebrook is in correspondence with the Reichsanstalt as to obtaining standard lamps. As soon as everything is in working order the laboratory will be able to assume the position and responsibility of a standard photometric authority, so far as this is possible without legislation. The establishment of this laboratory will be a great boon to electrical engineers, who will be able to look to it for guidance in some of the many vexed questions of photometry. The possibility of obtaining

a constant candle power incandescent lamp, such as that described by Prof. Fleming in his paper on photometry read before the Institution of Electrical Engineers, and of having it standardised by a competent and recognised authority, should act as an inducement to electrical engineers to pay more attention to the testing of lamps, and cannot fail to have a beneficial effect on the electric lighting industries.

WE learn from a short notice in the *Scientific American*, translated from *l'Illustration*, that the dirigible balloon constructed for the brothers Lebaudy by MM. Julliot and Surcouf has been experimented on with continuous success. The start has been made in every case from a cemented trench in front of the shed. A number of ascents have been made with the guide rope trailing on the ground, and finally the rope was drawn up, though so arranged that it could be instantly thrown to the ground and caught by people who followed the balloon on foot. Even though a fog came on so heavily as to cause fear that the balloon would be pulled down by the weight of the condensation, a safe return to the starting point was made, and M. Juchmes then took charge of the balloon and caused it to describe a figure of eight with great dexterity. MM. Julliot and Surcouf propose to attempt the journey from Moisson to Mantes and back as soon as a fine day occurs.

MEASUREMENT of electric resistance has been employed by M. Lesage as a method of analysis for certain fermentations and in pathological cases. A note on these experiments is given by M. Dongier in the *Bulletin* of the French Physical Society (No. 188). Samples of Parisian milk were found at a temperature of  $16^{\circ}7$  to vary in resistivity between 230 and 275, but it was found that watering the milk increased the resistivity while lactic fermentation lowered it. The resistance of culture broths generally was affected by the growth of the bacilli. The tetanus bacillus lowered it, and this lowering was not due to the toxin; others raised it, some left the resistance unaltered. The serum of the blood of man and animals, taken from healthy adults, varied from 97 to 104 ohms at a temperature of  $16^{\circ}7$ . Most diseases did not affect the resistivity, but some, notably typhoid fever, produced a noticeable increase, reaching to 117 ohms. The maximum in the case of typhoid occurred at the commencement of convalescence.

DR. J. MOUNT BLEYER has sent us a copy of the introductory address delivered by him at the American Congress of Tuberculosis, on "Light—its Therapeutic Importance in Tuberculosis as Founded upon Scientific Researches." Barely ten of the eighty pages are devoted to the subject in question, the bulk of the communication being occupied by the consideration of the vibratory theory of light and its relation to other forms of motion familiar to every student of elementary physics. The fact that tuberculous patients are benefited by light is well known, and the author describes a method of treating consumptives by exposing them to sunlight in specially constructed solaria, and to the electric light from powerful arc lamps. He relies upon the violet and ultra-violet rays for his results, and maintains that they have the power of penetration, ignoring the fact that Finsen has proved that the red colouring matter of the blood prevents the passage of the radiations at the violet end of the spectrum. If the blood circulating in the lobule of the ear is sufficient to prevent the blackening of photographic paper, it is obvious that a very small proportion of the actinic rays can penetrate the lung, and it is known that to destroy bacteria, concentration of the actinic rays is necessary. The beneficial effect is probably due to the stimulation of the skin by the light rays and not to any direct influence upon

the deeper tissues. The author does not, of course, rely upon light alone in the treatment of consumption, but combines with it "hygienic food, fresh air, exercise and such suitable remedies as are indicated." By a judicious combination of these measures, he claims that 75 per cent. of tuberculous patients are curable "to a certain extent."

THE fourth volume (1901) of the *Publicationen der König. ungar. Reichsanstalt für Meteorologie und Erdmagnetismus* contains an interesting summary and discussion of the lightning strokes that have been recorded in Hungary during the years 1890 to 1900. The author, Herr Ladislaus von Szalay, chief assistant of this institute, has written the text in two languages in parallel columns, so that those who cannot follow the Hungarian will probably be able to read the German. In his discussion of the observations, he treats of the distribution, frequency, periodicity, &c., of thunderstorms, and brings together a useful number of statistics relating to the same phenomena in other countries. A coloured map shows the geographical distribution of the thunderstorms, while an interesting diagram illustrates the eleven-year means of the frequency of incendiary flashes over 1000 square kilometres in Hungary. Full details, given in tabular form, of the thunderstorm records made at the several storm stations for the years 1896-1900 are added.

HERR VON SZALAY also contributes an interesting note on the peculiarity of lightning flashes to the *Meteorologische Zeitschrift* (Heft 10, 1902). He has found that the coherer of his instrument constructed to record the approach of thunderstorms was found sometimes to be quite insensitive to some flashes of lightning that were practically very near to it, while, on the other hand, it was in nearly continuous agitation during a distant storm when the sky overhead was cloudless. He relates that by watching the coherer and the lightning flashes simultaneously, he observed that flashes having sharp contours, whether from cloud to cloud or to the earth, agitated the coherer, but those that were diffuse were not recorded at all.

THE United States Weather Bureau has issued its report for the year 1901-2. It need scarcely be said that the work, which contains 342 quarto pages, mostly tables, contains a large amount of very useful information. In addition to the results relating to the year in question, it includes a valuable series of tables, showing, for each month, the highest and lowest temperatures recorded in each State since the time observations were commenced. The work also contains monthly and yearly results for a number of stations in the West Indies. The weather forecasts and storm warnings appear to have been very successful, and an important recognition from the secretary of Lloyd's is quoted as to the accuracy of forecasts of bad weather issued for the North Atlantic Ocean. A programme of aerial research in the upper strata of the atmosphere has been inaugurated under the care of Prof. Abbe, and, further, a valuable set of nephoscope observations at eleven stations in the West Indies has been secured between May, 1899, and May, 1902; these observations furnish, for the first time, the necessary data for discussing problems connected with the circulation of the atmosphere in the tropical zone, and possess especial interest in connection with the distribution of the ashes ejected from the volcanoes in May and June last. Experiments on wireless telegraphy are being made; the opinion at present seems to be that for permanent communication between land stations, wire is the more trustworthy means of communication, and probably the more economical.

THE current number of the *American Journal of Psychology* contains an elaborate experimental study of Fechner's colours (the colours of the "artificial spectrum top") by Miss F. W.

Bagley. The work was done, under Prof. Titchener's direction, in the psychological laboratory of Cornell University. Miss Bagley examines the effects of rate of rotation, length of black line, variation in size of sectors, width of line, position on the disc, contrast, intensity of illumination, colour of background, besides those of the general psychological factors, practice, attention and fatigue. She obtains particularly interesting results as regards the production of a subjective yellow and concludes that only a four-component theory of vision is adequate to her facts. The theory chosen, tentatively, is Ebbinghaus's modification of Hering's well-known hypothesis.

THE *Pioneer Mail* quotes a letter from a Ceylon paper in which a correspondent records killing a cobra that had partially swallowed a rat-snake. The cobra itself measured 4 feet 8 inches, and the disengaged rat-snake 5 feet.

WE have received vol. xx. part iv. of the *Schriften* of the Scientific Society of Dantsic. Among its contents is an illustrated account of the insects of West Prussia harmful to agriculture and horticulture, with suggestions as to the best means of combating their ravages.

THE fourth part of Prof. L. Bolk's important memoir on the anatomy of the Primates appears in part i. of vol. xxxi. of Gegenbaur's *Morphologisches Jahrbuch*. In this section the author describes in detail the cerebellum of the New-World monkeys. It is to be followed by an account of the same organ in the orang-utan.

DR. W. H. GASKELL, at the conclusion of a series of papers on the origin of vertebrates, published in the *Journal of Anatomy and Physiology*, summarises, in the January number, his views as follows:—"The consideration of the formation of the vertebrate cranial region indicates that the ancestor of the vertebrates was not an arachnid purely or a crustacean purely, but possessed partly crustacean and partly arachnid characters. In order to express this conclusion, I have used the term Protostraca, invented by Korschelt and Heider, to indicate a primitive arthropod group from which both arachnids and crustaceans may be supposed to have originated, and have therefore stated that the vertebrates did not arise directly from the annelids, but from the Protostraca."

IN the *Biologisches Centralblatt* for January 15, Herr E. Wasmann commences an account of an investigation into the phenomenon of "syphilism," that is to say, the harbouring of insects, &c., of various foreign species in the nests of ants and termites. It is stated that the number of syphilous arthropods exceeds a hundred, of which from eighty-five to ninety are beetles. All these syphilous insects, and more especially beetles, possess certain peculiarities by which they can always be recognised. Among the most notable are special exudation organs, such as pits or pores in the exoskeleton, mostly associated with pencils of yellow or reddish-yellow hairs. Moreover, most syphilous beetles have a characteristic colour, namely, oily reddish-yellow or reddish-brown. They also show certain modifications of the mouth-organs, especially of the labium, as well as "physogastrism," accompanied by excessive development of the fat-bodies, or sexual glands.

THE effects of natural selection and race-tendency upon the colour-patterns of the Lepidoptera formed the subject of an investigation recently undertaken by Mr. A. G. Mayor, the results of which are published in the *Science Bulletin* (vol. i., No. 2) of the Brooklyn Institute. It appears that the colour-markings of Lepidoptera consist of spots and bands, or of a combination of these two, the "combination-

markings" being the least frequent. Certain general types of variation in these markings are noticeable, but each family or genus has characteristic modifications of these types of variation. A definite relation exists between the number of markings on the fore- and the hind-wings. The species of a genus and the genera of a family are differentiated by modifications of certain dominant conditions, each genus or family displaying its own dominant conditions and following its own peculiar law of differentiation. On the whole, the investigation favours the view that new species have originated by mutation independent of environment, and generally not interfered with by adverse selection.

PROF. POTONIE, in a small work published by Gustav Fischer, gives an explanatory account of his pericaulom theory of the structure of plants. Probably the author would hardly accept as a description of his position the suggestion that it is an attempt to combine the views of Goethe and of Alex. Braun, but it seems nevertheless very much like it. The plant is conceived of as primarily originating from a dichotomising thallus, which gradually becomes, by unequal development of the two limbs, a sympodium. The leafy part seems to be formed as the outward prolongations of the terminations of the dichotomising arms. The theory is complicated by notions of congenital concrescence, but it does not seem to render the task easier of deciding as to what parts are to be attributed the properties of "Leaf-nature" and what "Stem-nature." He concludes (p. 40), on grounds that will probably not satisfy all anatomists, that in the highest plants the pith is to be regarded as the "urachse," the peripheral tissues belonging to the "pericaulom." It may be doubted whether these academic speculations will appeal to many botanists at the present day.

A SUBJECT list of the works on general science, physics, sound, music, light, microscopy and philosophical instruments, in the library of the Patent Office, has been issued at sixpence. The list consists of two parts: a general alphabet of subject headings (occupying 170 pages), with entries, in chronological order, of the works arranged under these headings; and a key (12 pages) or a summary of these headings, which serves the purpose of an index.

THREE more volumes of the first annual issue of the "International Catalogue of Scientific Literature" have reached us. Volume v. contains astronomical works and runs to 301 pages. Volume vii. deals with pure mathematics in 201 pages, and volume viii. with bacteriology in 314 pages. Those portions of the literature of 1901 which are not catalogued in the volumes of pure mathematics and bacteriology will form a part of the second annual issue of the catalogue.

MESSRS. JOHN BARTHOLOMEW AND CO., Edinburgh, have commenced the publication, in twenty one monthly parts, of "The Survey Atlas of England and Wales." The atlas is to contain eighty-four plates of maps and plans, with descriptive text, illustrating the topography, physiography, geology, climate, and the political and commercial features of the country. The maps have been designed and prepared under the direction of Mr. J. G. Bartholomew. The basis of the atlas is the Ordnance Survey, reduced, by permission, to the uniform scale of half-an-inch to the mile, in sixty-seven section maps, which are coloured according to contour lines. In order to correct the maps to date, the sheets have been submitted to local authorities for systematic revision, and the general maps have also been revised by specialists.

PROF. A. M. WORTHINGTON'S "Dynamics of Rotation," which was written several years ago to provide engineering

students with an elementary treatment of rigid dynamics, and was reviewed in *NATURE* of May 5, 1892 (vol. xlvi. p. 4), has so successfully fulfilled its purpose that it is now in its fourth edition. In this edition the author directs special attention to the use of the "inertia skeleton," in which a body is replaced by a dynamically equivalent system of three thin wires placed along the three principal axes at its centre of mass. This method of representation has been found to appeal to non-mathematical students far better than the conventional momental ellipsoid. Further attention has also been given to experiments with a gyroscope, which are so easily made that it is a matter for congratulation that they can now be studied in an elementary treatise. The author introduces the name "slug" to denote the mass to which a foot-pound unit of acceleration is produced by a gravitation unit of force.

ACCORDING to recent investigations, liquid sulphur dioxide is a solvent in which a large number of substances, organic and inorganic, are readily soluble. From experiments of Walden and Centnerszwer, published in the *Zeitschrift für physikalische Chemie*, it appears that sulphur dioxide forms complex compounds with many of these substances. From solutions of potassium iodide in liquid sulphur dioxide, they have obtained a crystalline compound of the formula  $KI_4SO_2$ , which melts at  $+0^{\circ}26$  C. Similar compounds are in all probability formed by other salts, and the name of "sulphones" is ascribed to this class of bodies.

IN the current number of the *Zeitschrift für physikalische Chemie* is a noteworthy paper by Messrs. Alexander Smith and W. B. Holmes in which the nature of amorphous sulphur is discussed. This so-called amorphous sulphur is formed when liquid sulphur is maintained in the molten condition for some time, and its amount increases as the temperature is raised. A method of determining the proportion of amorphous sulphur in the liquid variety has been worked out which depends essentially on the great difference in solubility of the two forms in carbon bisulphide. From parallel determinations of the proportion of amorphous sulphur and of the freezing point of the melt, it is shown that the lowering of the freezing point below  $119^{\circ}25$  C. is proportional to the quantity of the dissolved amorphous sulphur. The molecule of the latter in the solution of the soluble liquid form is found to be represented by the formula  $S_8$ .

A NEW reducing agent which promises to be of considerable service is described by Mr. E. Knecht in the current number of the *Berichte*. From the analogy between titanium and tin, it appeared likely that the chloride of titanium on reduction would give a lower chloride  $TiCl_2$ , analogous to stannous chloride. The reduction of the acid solution of the tetrachloride of titanium, however, produced the trichloride already known instead of the expected dichloride, but this, on examination, proved to possess remarkable reducing properties. Whilst applicable to reduction in a similar manner to stannous chloride, titanium trichloride is more powerful. Copper salts can be reduced to metallic copper; sulphites may be quantitatively reduced to hyposulphites, or, if the action be pushed, sulphur is produced. By careful neutralisation with soda, the titanium can be completely removed as the hydrated oxide. The behaviour of titanium trichloride towards organic substances is also of interest; nitro-bodies are reduced immediately to amines, and in the case of substances containing more than one nitro group, the partial reduction is readily effected. Azo-bodies are attacked so sharply that they may be quantitatively estimated, and other reactions are given showing the wide range of applicability of this reagent.

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SOME time ago it was shown by M. C. E. Guillaume that it was possible to obtain nickel steel alloys which possessed extremely low coefficients of expansion, and in the current number of the *Comptes rendus* he gives a more detailed study of the conditions necessary to obtain such alloys. The expansion is influenced considerably by the presence of foreign elements such as manganese, carbon and silicon, and it has been found that if these are reduced below a certain amount, the alloy cannot be worked. Working under the most favourable conditions, an alloy has been obtained possessing a coefficient of expansion  $\alpha = (+0^{\circ}028 - 0^{\circ}002328) 10^{-6}$ , a figure which can be better understood when it is stated that a wire made of this steel, one kilometre in length, would alter in length in passing from  $0^{\circ}$  to  $20^{\circ}$  C. less than 0.4 mm. The importance of an alloy possessing such properties in geodetic work is obvious, and extensive use has already been made of it in the geographical service of the French army, in the marine hydrographical service and elsewhere. All temperature corrections in geodetic work become superfluous.

THE additions to the Zoological Society's Gardens during the past week include a Barnard's Parrakeet (*Platycercus barnardi*) from Australia, presented by Mrs. Jebb; a Hawfinch (*Coccothraustes vulgaris*), British, presented by Miss H. Brown; a Rufous Rat-Kangaroo (*Æpyprymnus rufescens*) from New South Wales; two Corean Cattle (*Bos taurus*, var.) from Corea, six Proteus (*Proteus anguinus*) from the Caves of Carniola, deposited.

#### OUR ASTRONOMICAL COLUMN.

ELEMENTS AND EPHEMERIS OF COMET 1903 a.—The following elements and ephemeris for this comet have been calculated, by M. G. Faye, of Paris Observatory, from observations made at Nice (January 19), Besançon (January 24) and Paris (M. Bigourdan, January 27); the necessary corrections for aberration and parallax have been made.

$T = 1903$  March 28.9468 M.T. Paris.

$$\begin{aligned} \omega &= 130^{\circ} 40' 55'' \\ \delta &= 0^{\circ} 41' 56'' \\ i &= 35^{\circ} 35' 6'' \\ \log q &= 9.67479 \end{aligned} \quad | 1903^{\circ} 0$$

Ephemeris 12h. M.T. Paris.

Date.	$\alpha$ app. h. m. s.	$\delta$ app.	$\log r$	$\log \Delta$	Bright- ness.
Feb. 9 ...	23 24 50	+ 8 7' 1	0.0619	0.2517	2.1
13 ...	23 31 17	+ 9 27' 7	0.0348	0.2395	2.5
17 ...	23 38 16	+ 10 53' 7	0.0056	0.2257	3.1
21 ...	23 45 49	+ 12 25' 1	9.9742	0.2101	3.8
25 ...	23 54 3	+ 14 2' 5	9.9403	0.1923	4.8
March 1 ...	0 3 2	+ 15 45' 5	9.9939	0.1721	6.3

The brightness on January 19 (about 10m. 0.11m. 0) is taken as unity (*Astronomische Nachrichten*, No. 3845).

THE CONSTANT OF ABBERRATION AND THE SOLAR PARALLAX.—In No. 529 of the *Astronomical Journal*, Dr. Chandler gives the results of an exhaustive inquiry, which he has conducted during the last ten years, into the various values obtained for the constant of aberration by different observers and methods. After discussing the trustworthiness of the methods employed, Dr. Chandler apportions various weights to the results obtained, and then rejects a number of these results as being too uncertain. He then determines the constant from the accepted results, and obtains, as the general mean, the value  $20^{\circ}521$  with a probable error of  $\pm 0^{\circ}005$ .

In order to show the effect of incorporating *all* the results, he determines the weighted mean of all the values and thereby obtains the value  $20^{\circ}517$ .

As a final result of the inquiry, Dr. Chandler accepts the value of  $20^{\circ}52$  for the constant of aberration, and this produces the value  $8^{\circ}78$  for the solar parallax.

A NEW FORM OF SPECTROSCOPE.—In No. 12, vol. xxxi.,